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1. GENERAL

1.1 Electronic Mail Service

An electronic mail service is now available to our customers. Its address is mhtsc!cs . The intended purpose of this service is to provide a quick and convenient mechanism for our customers to send information or make comments and suggestions.

Questions or problems of a priority nature should continue to be addressed via the UNIX Information Line (201) 582-4200. In order to use the electronic mail service, UNIX System Administrators should add the following entry to their L.sys file:

mhtsc Any ACU <baud> <phone#> login--login: nuucp ssword: nuucpnuucp

Where phone# is replaced with one of the following:

Cornet	8=273-4271
Commercial	(201) 582-9800=0000=4271

If you should experience any difficulties, please do not hesitate to call the UNIX Information Line.

1.2 UNIX Users' Meeting

The next UNIX Users' Meeting will be held on Thursday, March 10, 1983 in the Indian Hill Auditorium from 8:30 a.m. to 5:00 p.m. CST. For this meeting, we will feature a simultaneous television feed to the Arnold Auditorium at Murray Hill. We welcome suggestions for agenda topics and volunteers who wish to give presentations (by February 1, please). Please direct all suggestions to the UNIX Information Line (201) 582-4200 or send electronic mail to mhtsc!cs .

Because Bell System proprietary information will be presented, Bell System identification will be required. Visitors, resident visitors and contractors requiring admission should have their Bell System supervisor provide written authorization. Letters should be sent to UNIX Customer Support, Room 3C-412D, c/o BTL, Murray Hill, New Jersey, no later then March 7, 1983 in order to have names registered with the attending security representatives.

1.3 C Standards Committee

A meeting of the C Standards Committee was held on September 15, 1982. Representatives of many BTL areas were present, including Research, DMERT, #5 ESS and Computation Centers. A number of new language features were accepted, including the typing of arguments to functions, a readonly pragma for declarations, multiple external definitions and long variable names. Subcommittee activities include work on a standard C library header file and an investigation of benefits and costs of merging the preprocessor with the parser of the compiler.

In a more recent meeting, it was decided that the C language has two standards, a portable minimal standard and a UNIX standard. Arbitrary length variable names was included as part of the UNIX standard. For UNIX Release 6.0, we will support this new feature of the C language.

The previous definition of the C language limited the number of significant characters in variable names to eight. External names were possibly more restricted by the environment. The most restrictive environment limits external names to only six characters and one case. The new UNIX standard removes the restriction of both internal and external variable names to eight significant characters.

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This change can cause C programs that previously compiled successfully to fail by default with the UNIX Release 6.0 compiler. These problems are due only to inadvertent misspellings of variable names past the point where the name was previously silently truncated. However, all of these problems will be found while compiling, so code which has misspelled variable names can be quickly fixed. An option will be provided to restrict the compiler to the previous standard.

The `lint` command will assume the UNIX standard by default, while the `-p` (portability) flag will continue to conform to the portable minimal standard. In addition, the `-p` flag will also prompt `lint` to check for internal names which differ past the eighth character.

1.4 Valid Packet Sizes for BX.25

The manual entry for the BX.25 command `x25lnk` appears in the Release 5.0 Administrator's Manual under the heading *x25pvc*(1m). The `-p pktsize` option can be used to specify the packet size for a particular link. The manual states that the value of `pktsize` must be a number that is a power of 2 and lies between 16 and 1024 inclusive. The packet size of 1024 cannot be used on the 3B20S. The TN75B and TN82 communication devices on the 3B20S support a maximum packet size of 512 bytes.

Since neither DMERT nor the TNET packet switch support a packet size of 1024, there does not seem to be good reason why only UNIX should support 1024. Therefore, 512 bytes will be the maximum packet size supported across all systems in UNIX Release 6.0. Comments on the proposed change should be sent to `mhtsc!cs`.

1.5 OAS I Release 2

OAS I Release 2 (OAS I R2) is a UNIX-based Office Automation System developed by Bell Laboratories. It is based on OAS I Release 1, which is currently being licensed by Western Electric within the Bell System. OAS I R2 combines powerful word processing capabilities with a spread-sheet calculator package, personal calendar, electronic mail, and teleconferencing services.

The major new feature of OAS I R2 is its power typing capability—a superset of the leading word processing system in the commercial marketplace. Through a special local processor and local work-stations, it provides sophisticated formatting capabilities, friendly user interface, local storage and local processing. The power typing work-stations are ergonomically designed, and have dedicated function keys that allow the user to change format lines, margins, and typefaces at the touch of a button. OAS also provides automatic conversion of documents between the Release 1 editor-formatter, the Release 2 word processor, and the Wang word processing system.

The spread-sheet calculator package offered by OAS is a superset of the leading professional package in the desktop computer marketplace. Its capabilities include file merging (values from one table can be inserted into another table), individual column width selection, and full word command lines. In addition, rows and columns may be inserted into ranges without changing formulas.

The personal calendar allows users to keep an agenda of appointments and "things to do" on the computer. They may specify private entries and reminders, as well as view other people's calendars. The Release 2 `freetime` feature finds compatible free time among calendar users, facilitating scheduling of meetings among different parties. New flexible date and time syntax has been added to make `calendar` even more user-friendly.

The electronic mail system allows users to send, read, scan, answer, and forward electronic mail. Release 2 provides automatic addressing and printing of mail for non-OAS users, as well as the capability to mail to UNIX logins.

OAS I Release 2 incorporates UNIX Release 5.0 performance improvements. In addition, the calendar facility performance has improved 100-200% (as compared with Release 1) and electronic mail performance has improved 40%.

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OAS I Release 2 will be ready to order from Western Electric at the end of 1st quarter of 1983. For more information call the UNIX Customer Support Information Line at (201) 582-4200.

1.6 UNIX Release 5.0 Performance

UNIX Release 5.0 has made dramatic performance gains on the WECo 3B20S and the Digital Equipment Corporation (DEC) VAX. Highlights are summarized below; detailed information can be found in the UNIX 5.0 *System Release Description* (SRD) which was sent to all UNIX System Administrators.

The 3B20S executes C code 13% faster than before due to compiler and microcode improvements. VAX-11/780 and PDP-11/70 object code speeds are essentially unchanged.

UNIX Release 5.0 compilations of small programs on the 3B20S and VAX machines take place approximately 2.1 and 1.3 times faster, respectively, than previously. The faster compilation times reflect improvements to the kernel and C library, as well as the compiler.

Improvements have been made to a variety of C library I/O functions. For small numbers of bytes handled, the improvements tend to be minor; for large operand strings, however, the Release 5.0 functions are up to a factor of five faster.

Operating system kernels for the 3B20S and VAX-11/780 are responsible for much of the overall Release 5.0 performance improvement. Table 1 lists the times (in milliseconds) for a variety of kernel functions along with the percentage improvement in execution speed. VAX-11/750 percent improvements since Release 4.0 are similar to those of the VAX-11/780. Note that in the following table, improvement percentages for UNIX Release 5.0 versus UNIX Release 4.0 are calculated as (4.0 time/5.0 time - 1) * 100%.

Operation	*WECo-3B20S*		*VAX-11/780*		*VAX-11/750*	*PDP-11/70*	
syscall (**getpid**)	.19	(32.8)	.18	(0.0)	.30	.23	(6.0)
context switch	.45	(15.6)	.71	(11.1)	1.02	1.03	(29.1)
chdir '.'	1.19	(7.5)	1.22	(141.8)	1.92	3.35	(-3.6)
open/close 'file'	1.90	(86.9)	2.47	(168.8)	3.85	6.82	(0.3)
search path 3 lev.	4.11	(59.4)	5.93	(174.9)	8.96	17.1	(2.3)
search dir. 32 pos.	2.19	(91.1)	3.03	(138.0)	5.11	11.1	(0.9)
pipe 512 bytes	2.62	(16.8)	3.21	(3.7)	5.05	5.69	(4.4)
pipe 1024 bytes	3.14	(42.7)	3.91	(24.0)	5.66	8.61	(3.1)
read 512 - buf cache	1.11	(21.6)	1.38	(0.1)	2.05	2.51	(0.4)
read 1024 - buf cache	1.44	(49.3)	1.81	(19.3)	2.57	4.17	(0.5)
access disk block	3.1	(-2.9)	3.1	(-2.9)	4.69	4.19	(2.6)
read 4K file	16.4	(89.6)	19.4	(107.0)	34.7	66.3	(1.7)
fork/exit 8K data	17.4	(31.2)	21.6	(10.2)	28.3	23.9	(6.7)
exec 8K bss	13.6	(27.2)	18.5	(10.3)	25.7	34.6	(13.0)

TABLE 1. Kernel Function Execution Time in msec (% Improvement)

In Table 1, the faster context switches reflect an improved `sleep/wakeup` mechanism. The 3B20S file operation improvements are due to the institution of an `inode` cache and improved path search algorithms. The faster VAX file operations are attributable to improved `file` and `inode` table searches.

The improvements in `pipe` operations for 1024-byte units on the 3B20S and VAX are mainly the result of the switch to the larger 1024-byte buffer size. Note that a single 1024 byte transfer takes place much faster than a pair of 512 byte operations; user application programs that currently do `I/O` in units of 512 bytes will obtain much better performance if changed to 1024 byte transfers. For programs that do `I/O` via the C library, this is taken care of automatically when the programs are recompiled. Although the time for disk block access has changed relatively little, disk accesses now transfer twice as much data; the improved

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performance is demonstrated by the shorter CPU times to read a 4096 byte file.

Systems with front-end processors (3B20S and VAX-11/780's with KMC/DZ) are capable of large volumes of terminal traffic with very low host CPU overhead. In general, Release 5.0 terminal handling overhead is 10% to 40% lower than previously. Input overhead for VAX-11/780 with KMC/DZ assist, however, is up to an order of magnitude lower as the result of revision of the KMC driver, which now avoids unnecessary character-at-a-time interrupts.

Overall, measurements indicate that the 3B20S, VAX-11/780 with KMC and PDP-11/70 systems are unlikely to be burdened by CPU overhead from terminal handling. Therefore, no restrictions need be placed on the use of 9600-baud lines for normal interactive use.

Our time-sharing benchmark measures system throughput by executing shell scripts comprised of UNIX commands modeled on a Bell Laboratories program development environment. Peak throughputs are compared in Table 2 and are a measure of system capacity; experience shows that 10,000 jobs/hour in Table 2, corresponds to roughly thirty-five (reasonably) satisfied users.

Machine	*4.0*	*5.0*	
WECo-3B20S	7.56	9.95	(32%)
VAX-11/780	7.79	9.75	(25%)
VAX-11/750	n/a	6.01	(n/a)
PDP-11/70	5.92	5.83	(-1.6%)

TABLE 2. Peak Throughput in 1000 jobs/hr (% Improvement)

The 3B20S and the VAX-11/780 posted gains of 32% and 25%, respectively. Table 2 throughput gains translate into corresponding increases in the number of program development users that can be supported. Note that a VAX 11/750 running UNIX Release 5.0 can support more users than a PDP 11/70.

The 3B20S and VAX throughputs are for systems configured with 200 system buffers. Installations with lots of memory may get a further performance increase by configuring with a larger number of buffers; further information is contained in the SRD.

1.7 Common Synchronous Interface

On synchronous communication lines the UNIX Operating System supports several protocols, for example, X.25, 3270-like synchronous terminals and IBM RJE work stations. The natural layering of these protocols result in an implementation of several communicating modules.

Level 1, the Physical Layer, is concerned with transmitting raw bits over a communication channel. Level 2, the Data Link Layer, ensures the integrity of a particular frame of data transmitted between two sites. Level 3, the Network Layer, essentially converts messages into packets and directs them to their destination, ensuring that the packets arrive correctly and in sequence.

In the UNIX Operating System, Level 2 protocols are implemented on microprocessors (configured on the host machine) and higher level protocol layers are implemented on the host. Prior to UNIX Release 5.0, the Level 3 protocol layer software was not portable between the DEC and 3B20S processors. This was because the software had to interface to different microprocessors that executed the Level 2 protocol layer.

In UNIX Release 5.0, a device independent interface is provided between the Level 3 and Level 2 protocols. This Common Synchronous Interface (CSI) allows the Level 3 protocols to be portable across the DEC and 3B20S processors. The interface consists of procedure calls that implement a number of commands and reports, and is a configurable pseudo-device in UNIX Release 5.0. The existing Level 3 protocol layer drivers are converted to use CSI in UNIX Release 5.0 and require that CSI be configured in the UNIX system.

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1.8 Release of Commercial UNIX System V

On 16 November 1982, AT&T announced plans to license (both domestically and internationally) the UNIX System V with support early in 1983. The announcement came in the form of a news release. Also, letters were sent to both domestic and international licensees informing them of the availability of the new system.

The UNIX System was first licensed in 1974 as Version 4; this was followed by Version 6 in 1976, PWB/UNIX in 1977, Version 7 and UNIX-32V in 1979, and System III in 1981. In general, each of these versions were licensed to outside users approximately two years after availability within the Bell System. System V (corresponding to internal Release 5.0) will be made available to users in response to their requests to be provided with the most current version of the system.

Support will be provided by the Western Electric Company. The UNIX Software Support Group will be located at the Network Software Center in Lisle, Illinois. UNIX support for Bell System customers will continue to be provided by Western Electric at Murray Hill. In addition to standard support elements, training courses will be offered in the form of classroom instruction and technical seminars. Documentation over and beyond that available with System III includes several additional updated administrator and user guides, as well as a release document that details the changes between System III and System V.

Support will be provided only to source licensees. Binary licensees, receiving the UNIX system from a source licensee, are expected to receive support from the source licensee. Please note, no release prior to System V will be supported. Initially, System V will be supported on three DEC computers: the VAX-11/780 and 11/750, and the PDP 11/70. Currently, we license UNIX System III to run on the IBM 370 under TSS. We will continue to license this version but without support. At present, System V is available on the 3B20S only within the Bell System.

1.9 UNIX Release 6.0

UNIX System Release 6.0 planning and development is continuing with a target delivery date of fourth quarter 1983. Several feature requirement reviews have been held and the development of some features has been completed. The Release 6.0 prospectus, a document describing the 6.0 features from a customer perspective will be issued during the second quarter of 1983.

Many of the Release 6.0 features are being designed as separable extensions to the UNIX product. Consequently, some of these may be provided as "add-on" software packages to Release 5.0 in order to provide these features on a timely basis. Further information on Release 6.0 software packages will be presented in the *UNIX Systems Newsletter* as these plans firm-up.

1.10 Enhancements to the NSC Software for 6.0

The `nusend` software consists of a set of UNIX commands to support file transfer and remote execution across the NSC HYPERchannel network interface. The software is in use at most larger BTL UNIX facilities, and supports the #5 ESS project at Indian Hill.

The `nusend` package was enhanced for Release 5.0 to support multiple networks on a single computer and to improve performance and reliability.

For Release 6.0, additional enhancements are planned, including the following items:

- Improved user error messages so that if a file transfer or remote execution fails, the user will have a better indication of the required corrective action.
- New statistics gathering tools to summarize the data logged by the NSC network software.
- A capability to obtain status and/or delete NSC jobs by specifying the job number, `user id` or target processor name.
- A modification to allow commands executed on remote UNIX processors to be executed under the user's login name and home directory.

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2. MODIFICATION REQUESTS

at81-29406 Oct 21 1981; C. A. Salemi; *bx.25 link*; NO CHANGE
A command is needed (similar to `net`) to link two 3B20S processors using BX.25 connections. Since the hardware already exists, a software command utilizing the BX.25 protocol would be extremely helpful.

[The BX.25 session layer is due for UNIX Release 6.0 in the June '83 time frame. No effort will be made on this until we have the Session Layer in place; therefore, we recommend no change (rather than deferring for a long time period).]

ll82-14106 May 21 1982; Paul Trabert; *TN74*; NO CHANGE
Each TN74 has 2 asynchronous ports. When one of these ports goes bad, a `doff` (device off) command is issued to the TN74, which turns off both ports. Because of this, the remaining good port becomes inaccessible.

[This is consistent with the system design. When a hardware error is detected on a board, the board is taken out of service.]

bl81-05406 Feb 23 1981; Paul Jackson; *mail*; BEING FIXED
When printing out `mail`, if you reply to the disposition query with any of `y`, `w`, `s`, or `m`, followed by a blank and any additional amount of blanks and tabs, the `mail` command throws out that message.

[There is a logic error in the way `mail` handles white space (blanks, tabs) after a response to a prompt. The `mail` command will be modified to ignore this white space.]

bl81-09002 Mar 31 1981; S. D. Orshan; *nroff/troff*; NO CHANGE
The `nroff` command will currently recognize a `.`, `?`, or `!` at the end of a line as the end of a sentence, and add spaces accordingly. However, sentences ending with a quoted word or statement, will have the punctuation inside the quote if the rules of punctuation are followed correctly. Therefore, `nroff` should also recognize this condition at the end of a line.

[There are a couple of reasons why this is not a desirable change. First, many documents are very carefully laid out for page and paragraph break positions. Many existing documents would change their spacing in subtle, yet pervasive ways. This change would cause many end-users to spend time re-adjusting documents that "used to work right". In other words, this change is not upwards-compatible.

Also, the test for sentence terminators (`!`, `.`, and `?`) at the end of an input line is clear and simple. However, looking for punctuation immediately before a quote character is a non-trivial task (note that not all punctuation, especially within quotes, signals the end of a sentence). This is complicated even further by the common case of macro packages placing non-printing characters between text and a following quote (consider italic text preceding a quote—the end of the italics is padded with a partial space so that the text doesn't overlap the quote). Multiple spaces at the end of a sentence can still be produced by typing them in the input document.]

bl81-09802 Apr 8 1981; T. J. Kowalski; *uucp*; FIXED IN 5.0
If you have to call a system at 300 baud, with several waits for dial tones (i.e. = to get through multiple dimension systems), `uucp` does not wait long enough before trying a second or third number (as listed in the `L.sys` file). This comes about when the `acu` "hangs" waiting for a dial tone and never receives one.

[For UNIX Release 5.0 the calling/dialing routines have been improved. This problem does not exist in the 5.0 version of `uucp`.]

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bl81-10304 Apr 13 1981; W. T. Steinmetz; *sh*; BEING FIXED
Several processes start without coming to a conclusion under the following combination of conditions:

a. *Shell* for statements are nested too deep.

b. The for statements do not have an in clause.

c. The true or false commands are invoked by a *shell* variable.

Example:

```
set true
for i
do
        for j
        do

        done
done
```

[The sh command enters into an infinite loop when there are two or more nested for loops without in clauses. This is a bug and will be fixed in Release 6.0.]

cc82-21901 Aug 7 1982; M. Zaleski; *lp*; NO CHANGE
The lp command seems to have a bug in it that prevents it from working correctly. It seems that if a user attempts to print out a file with protection bits set to 0600, lp decides that it cannot access the file. When the protection bits of the file were changed to 0644, it correctly submitted the request.

[The reason that lp cannot read users' files set to 0600 is that it is set-bit (on execution) to owner "lp". This is done to prevent users from tampering with the queued spool files. Moreover, having the entire lp spooling system owned by "lp" also prevents users from tampering with the executable files. Requiring users to print private (0600) files by typing cat x | lp , instead of lp x , is deemed to be a minor price to pay in exchange for security of the system.]

cc82-30301 Oct 30 1982; P. D. Shaw; *start.s*; BEING FIXED
On VAX-11/750's with new DEC memory (1MB/board), UNIX sizes memory incorrectly and crashes during initialization. The problem is caused by the algorithm which makes incorrect assumptions about the state of memory configuration registers. Fixing the problem involves elimination of the VAX-11/750 special case in os/start.s in the memory-sizing phase of initialization.

[Memory sizing code on the VAX-11/750 is incorrect with new 1MB memory boards. The code has been generalized so the special case for the 11/750 is eliminated. The size algorithm is now used for both the 11/750 and 11/780. This fix is included in Release 5.0.1.]

ll82-14001 May 20 1982; J. K. Fellin; *3b20S hardware*; NO CHANGE
A user program that generates an addressing fault causes the hardware to produce a "my store a" error during processing and create a core-dump of the user process. The address fault is generated by storing a halfword onto a byte boundary. Byte boundaries start on either bit 8 or bit 24.

The program statements causing this are:

```
struct drop { short i,j,k,l; char c[20]; }
main()
{
        struct drop dropstruct, *dp;

        dp=&dropstruct.c[3];
        dp->i = 99;
}
```

[Writing half-word data onto a byte boundary should cause a dump. Another MR (mh82-15403) refers to a case which causes a MRF; this will be corrected in Release 5.0.1 by a pump-code change.]

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ll82-14105 May 21 1982; Paul Trabert; *TN74*; FIXED IN 5.0

When we turn off a port using `getty`, the *TR* light on the modem stays lit because the *TR-lead* (pin 20) is always on. The *TR* lights stay lit even when the system crashes. Because of this, the modem still answers incoming calls when the port is turned off or when the system has crashed. Thus, the user does not know that the system is down and is charged for the call.

[This problem is fixed in Release 5.0.]

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UNIX SYSTEMS NEWSLETTER

Reader Response Form

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Name: _____ Company: _____

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